http://topology.nipissingu.ca/tp/

TOPOLOGY PROCEEDINGS

Volume 62, 2023

Pages 81–97

Depicting a Generalized Shift Move in Crown Diagrams

by

Jonathan D. Williams

Electronically published on February 13, 2023

This file contains only the first page of the paper. The full version of the paper is available to Topology Proceedings subscribers.
See http://topology.nipissingu.ca/tp/subscriptioninfo.html for information.

Topology Proceedings

Web:	http://topology.nipissingu.ca/tp/
Mail:	Topology Proceedings Department of Mathematics & Statistics Auburn University, Alabama 36849, USA
E-mail:	topolog@auburn.edu
ISSN:	(Online) 2331-1290, (Print) 0146-4124

COPYRIGHT © by Topology Proceedings. All rights reserved.

http://topology.nipissingu.ca/tp/
TOPOLOGY PROCEEDINGS
Volume 62 (2023)
Pages 81-97
E-Published on February 13, 2023

DEPICTING A GENERALIZED SHIFT MOVE IN CROWN DIAGRAMS

JONATHAN D. WILLIAMS

Abstract. We give a diagrammatic way to perform a generalized shift move on a crown diagram of a smooth 4-manifold. Applications include a simplified proof that if two crown diagrams are related by a generalized shift move, then they are slide-equivalent; a method for converting a genus $g > 1$ Lefschetz fibration into a crown diagram; and a proof that the vanishing cycles of such a crown diagram are slide-equivalent to a standard inclusion of the Lefschetz vanishing cycles into a genus $g + 1$ surface.

1. Introduction

The study of the interplay between critical points of smooth mappings, the topology of their domains, and the diagrams that record them is a classical one which continues to yield interesting results, for example the relation between Lefschetz fibrations and trisections in [3]. This paper adds the corresponding result for a closely related object, called a crown diagram, by depicting how a rather local creation and cancellation homotopy involving the well-known critical points called indefinite cusps can change the global fibration structure of a smooth 4-manifold as recorded in a crown diagram. The *maps* in this paper have a lot of names, such as "excellent maps" [8], "Morse 2-functions" [4], and "purely wrinkled fibrations" [7]. Suffice it to say that in this short introduction they are maps from a smooth 4-manifold to a smooth 2-manifold whose singular sets consist of indefinite cusps and indefinite folds. In this paper, we use

2020 *Mathematics Subject Classification.* Primary 57R15; Secondary 57R22, 57R45.

Key words and phrases. crown diagram, 4-manifold, Lefschetz fibration.

©2023 Topology Proceedings.

This file contains only the first page of the paper. The full version of the paper is available to Topology Proceedings subscribers.
See http://topology.auburn.edu/tp/subscriptioninfo.html for information.